

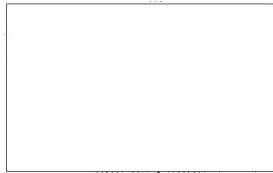
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27 January 1956

RECORDED FOR: CHIEF, TEC/PHOTOGRAPHIC DIVISION

SUBJECT: Collapsible Lens Barrel.

This memo is to confirm the transfer on 9 January 1956 of the subject device to your office. Attached is a report covering work done on this project. It is requested that an operational evaluation report be submitted by your office to assist us in any future development of items of this type. If any further work is desired on this or other units of similar design, it is requested that a requirement be forwarded to this office before 10 February 1956.



TTS/ADP

~~Approved:~~

C/TES/ADP

Attachments:

Evaluation Report

Distribution:

Orig. & 1 - Addressee
 1 - TES/ADP
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|---------------|----------------------|---------------|
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~~REPORT OF SUBJECT SUBMITTED FOR OPERATIONAL EVALUATION~~1. Name of Device: Collapsible Lens Barrel2. AFD Project Number: A1 Doc #303. AFD Contractor & Contract Number:

25X1

4. AFD Project Engineers:

25X1

5. Requirement Source & Date:

Memo from C/200/70 for C/200/AFD dated 28 June 1975

Subject: Request for Development of Telescoping 48"

Focal Length Lens

6. References:a) Memo from C/200/70 for C/200/AFD dated 28 June 1975
Subj: Request for Development of a Telescoping 48"
Focal Length Lensb) Memo from C/200/AFD for C/200/70 dated 29 August 1975
Subj: Telescoping Lens Barrel7. Discussion: The subject device along with manufacturing drawings was completed and delivered to AFD 19 December 1975. The unit complies with the original specifications outlined in the referenced memorandum a) with the exception of the focal length and the number of units to be fabricated. The focal length is 48" instead of 40" and one unit instead of three was constructed in accordance with the referenced memorandum b).8. Unit Specifications:a. Lens Used: Astrob. Focal Length: 48"c. Lens Opening: f 6.3d. Collapsed Length: 15"e. Extended Length: 48"~~SECRET~~

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f. Maximum Barrel Diameter: 7 3/4"

g. Item Weight: 18 pounds

9. Assembly of Device: The subject device is extended for operation using the following steps: (see referenced figures)

a. The lens cap is screwed off of the back of the lens as is indicated in figures 1 and 2.

b. The middle section, along with the end section, is extended from the outside housing and threaded by applying pressure between it and the outside member in the direction of extension while screwing the member counterclockwise with relation to the outside section as viewed from the back of the lens barrel (top end as viewed in figure 4). This engages the outside and middle section of the barrel. Care must be exercised not to "freeze" the lens by "spinning" the two sections into a locked position as the end of the travel is reached. Figure 4 illustrates the lens system after this operation.

c. The outside section is extended from the middle section housing and screwed counterclockwise to engage it in the extended position similar to the operation already described with relation to the first two sections. Figure 5 illustrates the unit after this operation.

d. The locking member on the end of the barrel may then be rotated counterclockwise permitting removal of the extension housing from its well within the end section. The extension element is locked into any position by rotating the locking member at the end of the end lens section clockwise with relation to the rest of the lens barrel as viewed from the back of the barrel. This operation is shown completed in figure 6.

e. The unit is now secured to the tripod by grasping the unit under the right arm while fastening the tripod locking screw with the left into the housing provided at the flange at the back end of the outside barrel. Figure 7 illustrates the unit thus secured to the tripod. An additional tripod socket is provided at the flange at the end of the middle section.

f. The lens cap may then be removed and lens hood extended forward from its concentric position on the lens barrel. A stop is provided preventing removal of the hood

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from the lens barrel. The Exacta camera is locked on the back of the lens in the conventional manner being sure to feed the camera onto the lens in such a position to insure an interlock between the two elements. Figures 8 and 9 illustrate the unit after these operations.

The subject device is collapsed for storage by reversing the above assembly steps. The operator must be opened fully, however, before attempting to collapse the unit or the diaphragm will be damaged.

10. Servicing of Device: The glass elements may be cleaned by removing the retaining ring in the front of the lens barrel. This is a difficult operation, however, and should not be undertaken except under suitable conditions.

11. Resolution Tests: Tests conducted with the unit have indicated the following:

**Resolution Test of f 6.3 - 40" Focal Length Astro
Lens Fitted in a Collapsing Barrel**

| No. | Opening | Resolution* | Corrected Resolution** | Remarks |
|-----|---------|-------------|---------------------------|--------------|
| 1 | 6.3 | None | None | Obstruction |
| 2 | 6.3 | 5 | 11 | |
| 3 | 6.3 | 3.5 | 8 | Thin |
| 4 | 6.3 | 3.5 | 8 | Thin |
| 5 | 8.0 | 7 | 15 | |
| 6 | 8.0 | 5 | 11 | Thin |
| 7 | 8.0 | None | None | Very Thin |
| 8 | 11.0 | 7 | 15 | |
| 9 | 11.0 | None | None | Not Expanded |
| 10 | 11.0 | 7 | 15 | |
| 11 | 11.0 | 5 | 11 | Thin |
| 12 | 11.0 | 5 | 11 | Thin |
| 13 | 16.0 | 12 | 26 | |
| 14 | 16.0 | 7 | 15 | |
| 15 | 16.0 | 3.5 | 8 | Thin |
| 16 | 22.0 | 12 | 26 | |
| 17 | 22.0 | 12 | 26 | |
| 18 | 22.0 | 5 | 11 | Thin |
| 19 | 32.0 | 12 | 26 | |
| 20 | 32.0 | None | None | Thin |

* Resolution as read from charts

** Corrected resolution for the ratio of object distance to image distance which was different from the prescribed distance ratio of 26 indicated for the M35 charts used.

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These tests were made on Plus-X film in the basement corridor of Westover Building at a distance of 200 feet from lens to object. The object was illuminated by a KODAK-Clarke electronic flash at 100 watt seconds after opening the camera shutter on bulb. Development was for 16 minutes at 70° F in Microdol. The resolution results were corrected for the departure from the prescribed object to image distance ratio of 25. The actual ratio of 200 feet to 3.33 feet of 60 was used to correct to the original readings as indicated. At a given opening certain of the exposures resulted in a lower resolution than other exposures due to the poor image quality of the unexposed negatives. Under similar conditions the Quarter lens resulted in a resolution of 26 lines/mm. The visual resolution with the lens at f-4.3 was about 26 lines/mm or about 2.5 times the photographic resolution.

12. Summary Evaluation: Results of the limited photographic tests conducted indicate the Astro lens is of poorer quality than had been expected. The subject device, however, is deemed adequate for its intended purpose. Any improvements should be incorporated in any future designs of a similar nature.

13. Recommendations for Future Units: Suggested improvements for any additional units are:

- a. The front tripod support should extend farther forward on the lens barrel permitting a standier mount.
- b. The tripod sockets should be recessed for lining up the tripod lock screw and the tripod socket.
- c. The tripod sockets on the lens should be separated by a larger distance to permit easier utilization of two tripods.
- d. The securing of the different section of the barrel should be facilitated by easier meshing of one set of threads with the other either through lead in flares or by adoption of a different system. One possible system would be to use a bay and groove with a locking ring.
- e. Provision should be made to prevent interlocking of the barrel elements through a suitable system of stops at the end at the travel.
- f. The focusing system should have a fine focus adjustment. The locking arrangement on the present unit is satisfactory for rough focusing and could probably be modified to include a fine focus at the end of the extension barrel adjacent to the camera mounting.

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- g. Markings should be made on the barrel to indicate direction of rotation of the various threaded parts to either lock or unlock the elements.
 - h. The front lens cap should be a screw on type rather than the friction fit provided.
 - i. A more suitable system for interchange of adaptors for different cameras should be provided.
 - j. Suitable filters should be provided with the unit.

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Fig. 2.

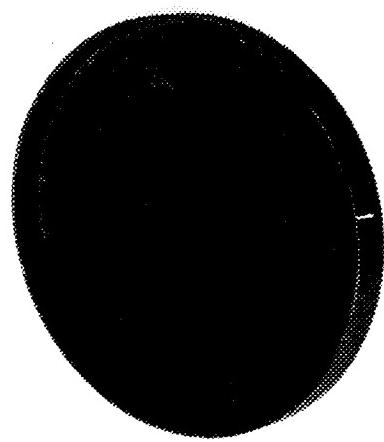


Fig 3

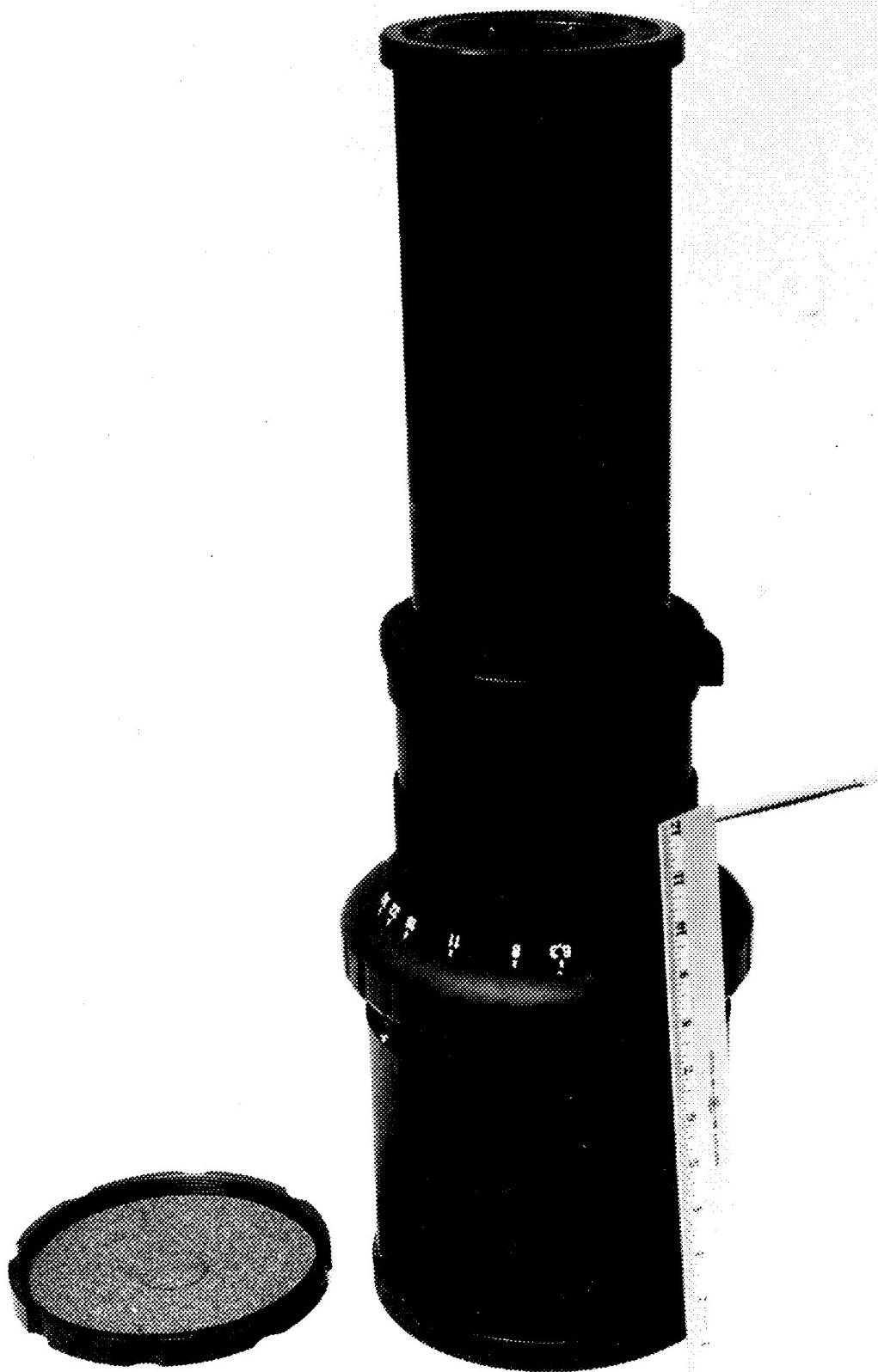
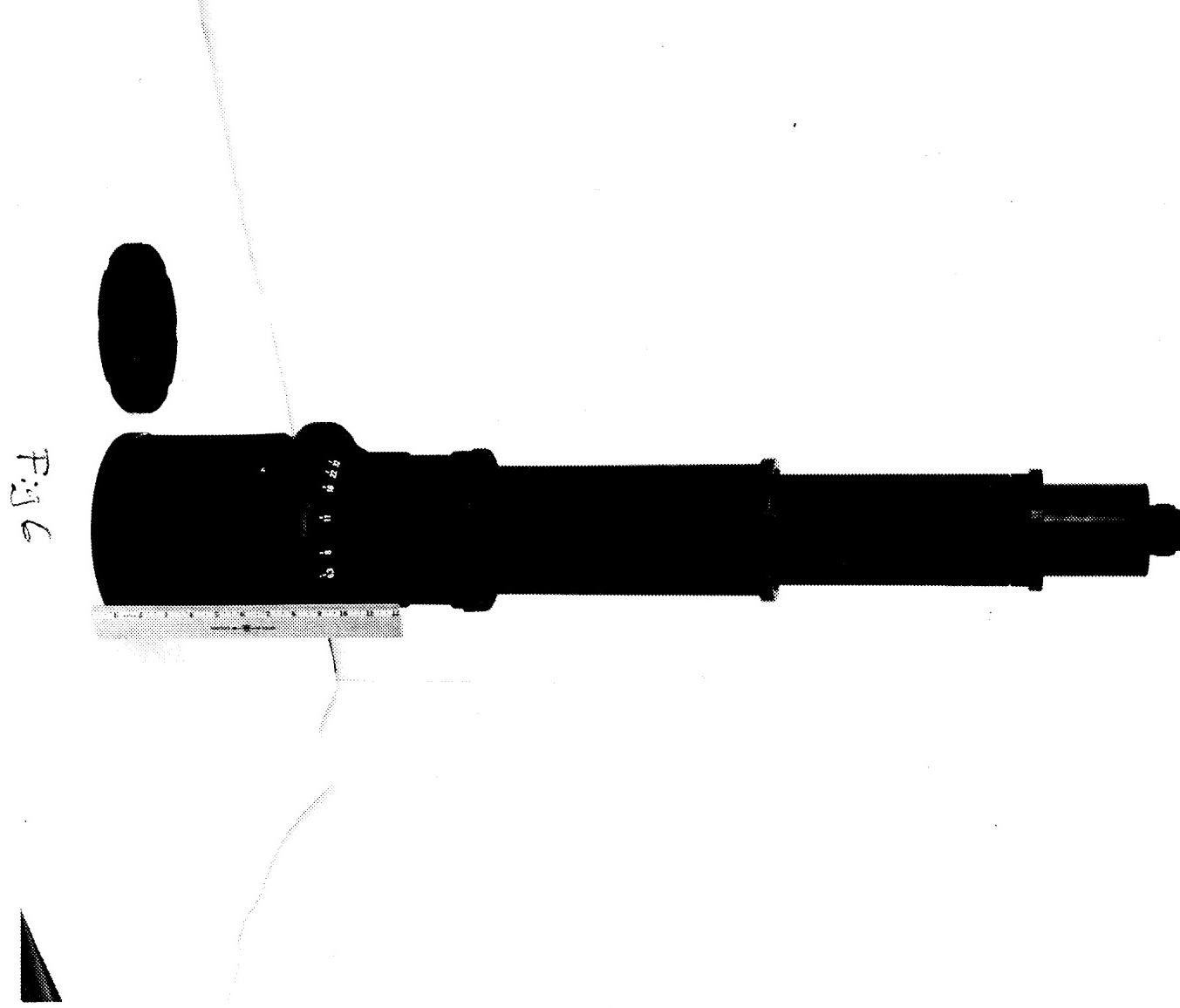


Fig 4



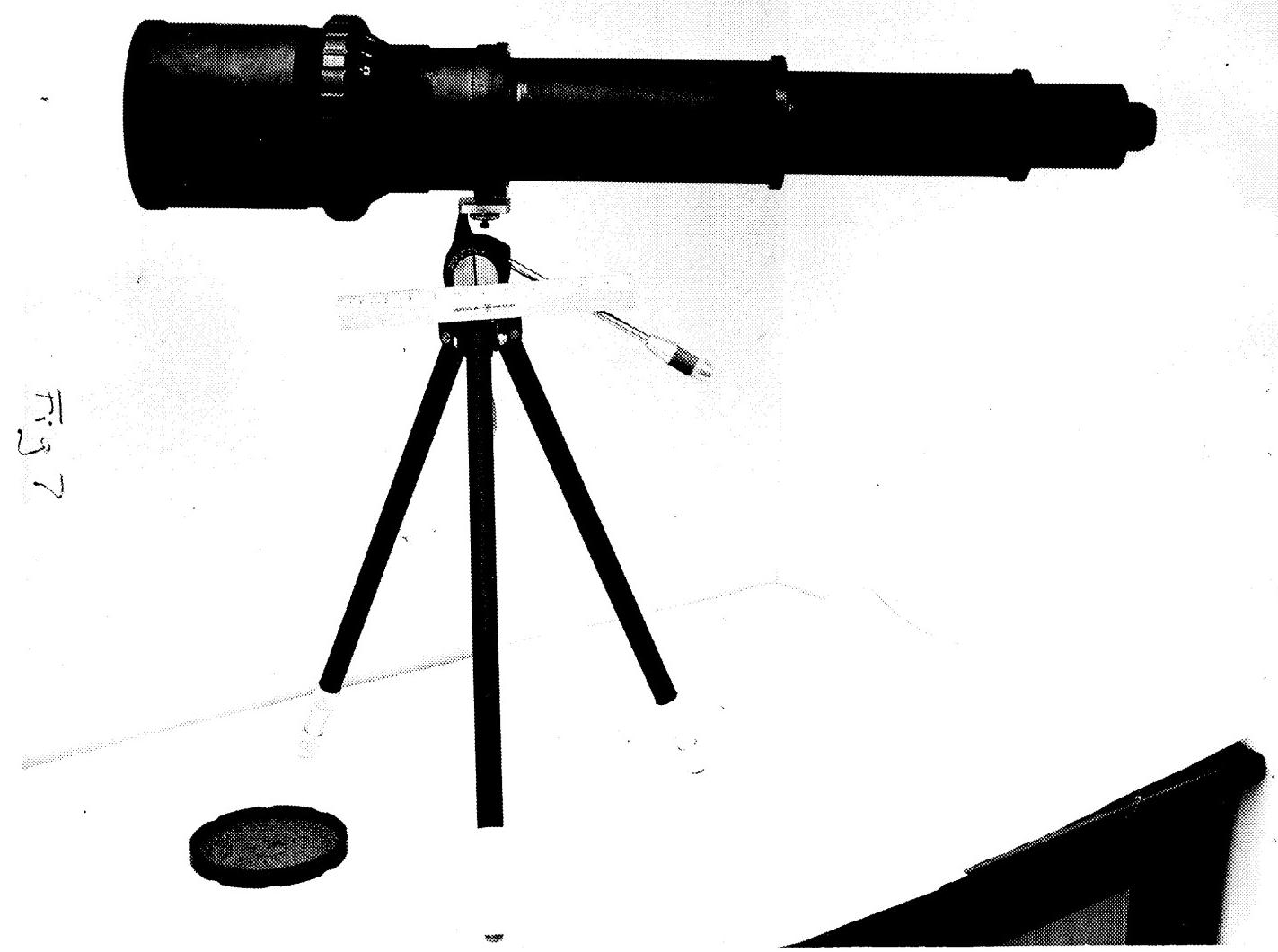
Fig 5

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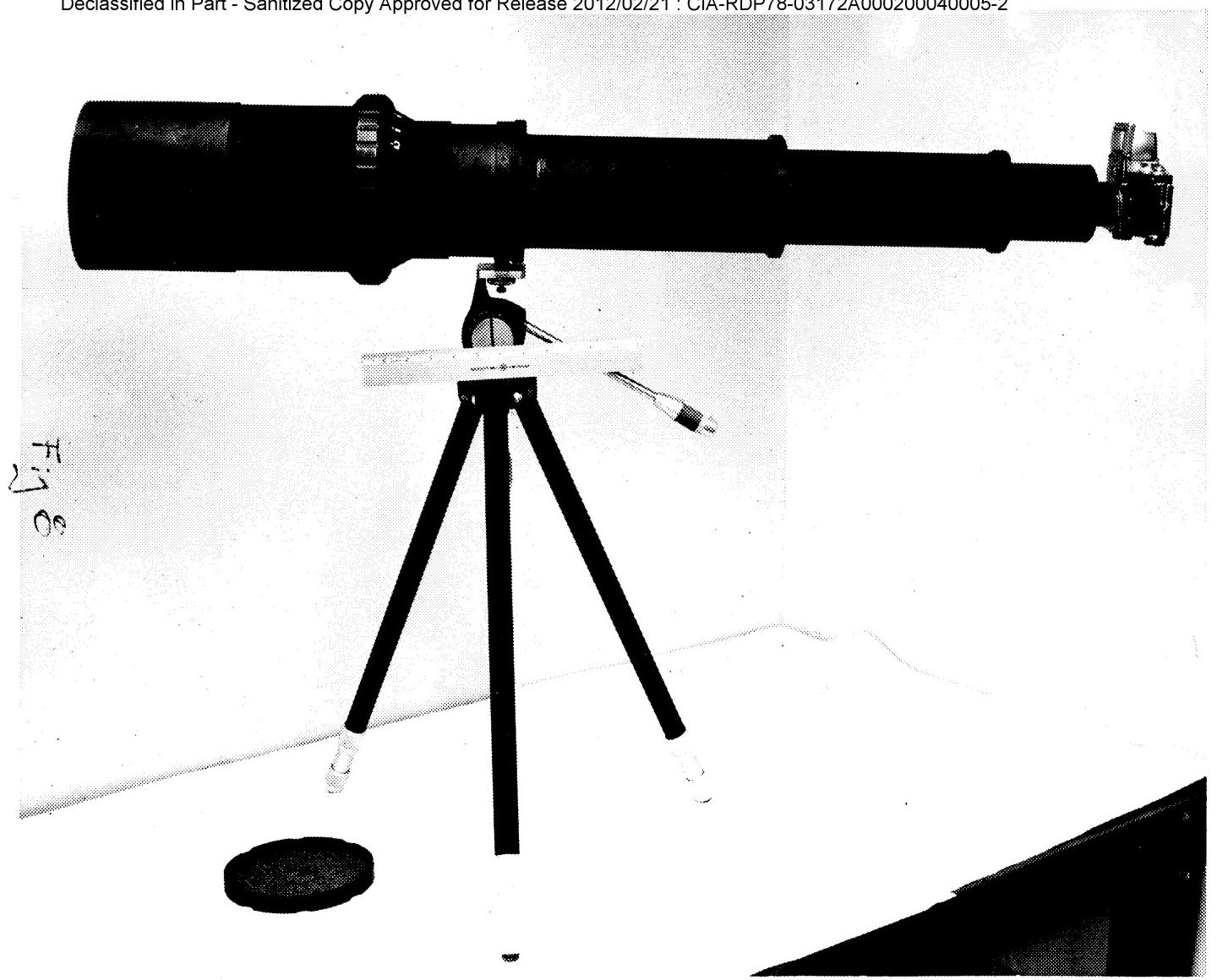
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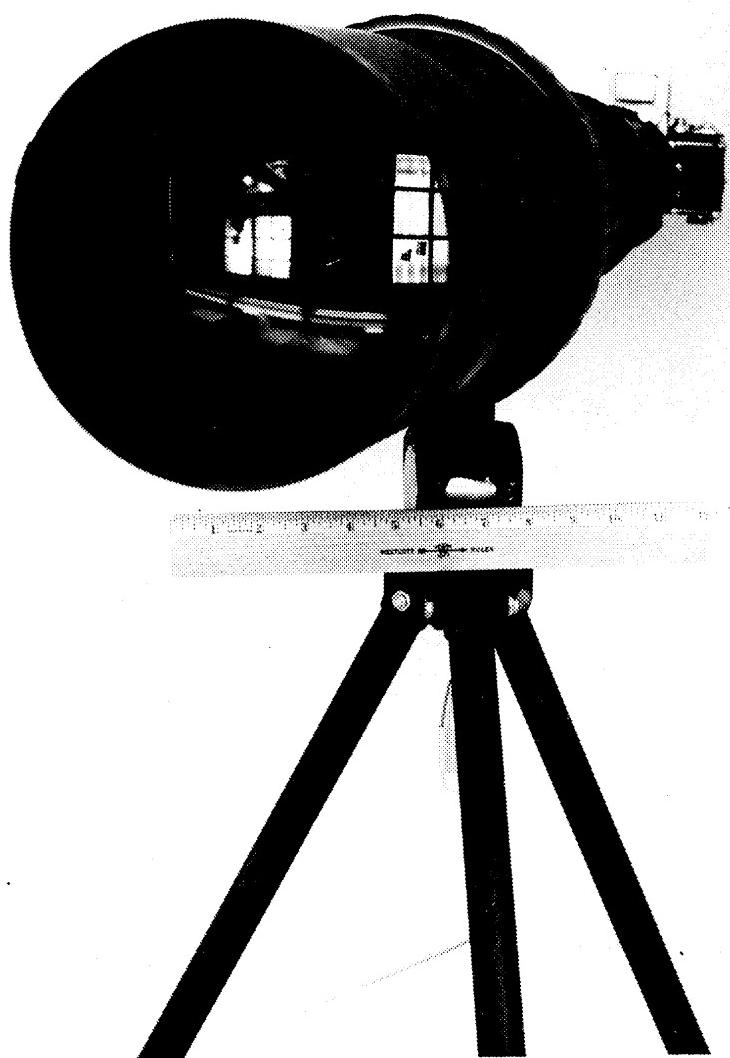
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